30640
S/081/61/000/020/044/089
B107/B101

Effect of mercury chloride ...

degrees of hydrogen absorption as dependent on the conditions of the process. [Abstracter's note: Complete translation.]

Card 2/2

RAPOPORT, I.B.; ULANOVA, M.F.

Composition of high-molecular carbonyl compounds (ketones) obtained by the synthesis from CO and H_2 on an iron-copper catalyst. Neftekhimia 1 no.3:392-396 My-Je '61.
(MIRA 16:11)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut po pererabotke nefti i gaza i polucheniyu iskusstvennogo zhidkogo topliva.

MUZOVSKAYA, O.A.; RAPOPORT, I.B.

Effect of sulfur organic compounds on the process of synthesis over iron catalysts. Khim. i tekh. topl. i masel 6 no. 5:5-10 My '61. (MIRA 14:5)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut po pererabotke nefti i gaza i polucheniyu iskusstvennogo zhidkogo topliva. (Sulfur organic compounds) (Catalysts)

S/081/62/000/005/086/112
B162/B101

11 9700

AUTHORS: Fal'kovskaya, A. A., Vavul, A. Ya., Kheyfets, Ye. M., Rapoport, I. B., Listov, V. A., Petyakina, Ye. I.

TITLE: Efficiency of some molybdenum and organosulfur compounds as antiwear additives to lubricating materials

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 5, 1962, 530, abstract 5M24 (Sb. "Prisadki k maslam i toplivam". M., Gostoptekhizdat, 1961, 71-79)

TEXT: It is shown that the additive S-15/30 (V-15/30), containing a complex compound of Mo, greatly improves the antiwear properties of mineral and synthetic lubricating materials; its action is particularly effective when used jointly with organic compounds containing S, Cl, and other elements. A disadvantage of the additive is its unsatisfactory thermal stability in certain high-temperature lubricating materials. The Mo-organic additive B-15/1 (B-15/1) can be used for preliminary application of antifriction noncorroding films on friction surfaces; in this case,

/B

Card 1/2

Efficiency of some molybdenum ...

the efficiency of high-temperature lubrication using various lubricating materials is greatly improved. The S-organic additive V-15/2 A (V-15/2A) is extremely effective as an antiseizing medium for high-temperature lubricating materials. 1.5 - 3% of it added to lubricating materials, including those prepared on a base of Si-organic liquids, greatly improves their lubricating capacity under conditions of high-temperature friction of heavily loaded parts. Abstracter's note: Complete translation.

B

Card 2/2

ULANOVA, M.F.; RAPOPORT, I.B.; POLYAKOVA, A.A.; ITSIKSON, T.M.

Composition of esters obtained in the synthesis from Co and H_2 on an iron-copper catalyst. Neftekhimiia 1 no.5:653-660 S-O '61. (MIRA 15:2)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut po pererabotke nefti i gaza i iskusstvennogo zhidkogo topliva.
(Esters)(Carbon monoxide)(Hydrogen)

21.001
S/080/61/034/006/002/020
D247/D305

AUTHORS: Rapoport, I.B., Fomina, V.V., Nichan, A.I.

TITLE: The study of nickel-magnesium hydrogenation catalysts obtained by the decomposition of oxalates

PERIODICAL: Zhurnal prikladnoy khimii, v. 34, no. 6, 1961, 1186 - 1192

TEXT: A method has been developed of producing a nickel-magnesium catalyst, for the hydrogenation of various organic substances, by deposition into an activated carbon carrier, instead of an alumina as described by I.B. Rapoport and Yu.V. Vyshelavtsev (ref. 1: Zh. P. Kh., 32, 8, 1758, 1959) and I.B. Rapoport and I. Par (ref. 2: Zh. P. Kh., 32, 8, 1764, 1959). The preparation involves impregnation of activated carbon mark BAY (BAU), of [illegible] fine size, with solutions of nitrates of nickel and magnesium containing [illegible] g Ni/ml and 0.014 - 0.018 g Mg/ml. After drying, Ni and Mg were converted to oxalates by treatment with [illegible] ammonium oxalate.

Card 1/3

24001
S/080/61/034/006/002/020
D247/D305

The study of nickel- ...

followed by evaporation, drying and washing. Catalysts on 0.0 (analytical dust) and 0.1 mm carrier were additionally pressed into tablets. Reduction was carried out at 350°C, by passing hydrogen at a rate of 10 l/hr of catalyst for 4 hrs. Activity of the catalyst was determined by studying the conversion of benzene into hexane, using a continuous flow apparatus. The experiments were conducted using catalysts of 2.02 - 59.1 % Ni content, on 0.0 - 5.0 mm grade carrier, at a temperature 100 - 235°C, pressure ranging from atmospheric to 10 atm. and a benzene flow rate of 0.1 - 1.2 l/l of catalyst/hr. The highest activity has been shown by catalysts containing above 5 % Ni on a carrier having a particle size of 0.0 - 2.0 mm, between 100° and 140°C, in the pressure range of 1 - 10 atm and at a flow rate of 0.5. The Ni-MgO/activated carbon catalyst system has been found to retain its activity for 200 hrs. when working under atmospheric or 10 atm. pressure. Repeated experiments established that a composition of 15 % Ni, 2 % Mg and 83 % carrier is the most active and stable in prolonged use. It gives 100 % conversion of benzene under atmospheric pressure at

Card 2/3

The study of nickel- ...

100-140°C and at a flow rate of 0.4 l/l catalyst/hr. At pressures of the order of 10 atm the efficiency of the same catalyst is trebled. There are 4 tables, 7 figures and 5 references: 4 Soviet-bloc and 1 non-Soviet-bloc.

SUBMITTED: June 27, 1960

Card 3/3

RAPOPORT, I.B.; BOL'DBERG, V.M.; ITSIKSON, L.B.

Dehydrogenation of alcohols on a copper-calcium catalyst. Zhur. prikl.khim. 34 no.11:2544-2550 N '61. (MIRA 15:1)
(Alcohols) (Dehydrogenation)

KHEYFETS, Ye.M.; MILOVIDOVA, N.V.; RAPOPORT, I.B.; YUDAKOVA, R.N.; ZEL'VYANSKAYA, Ye.B.

Synthesis of secondary alcohols and their esters from olefins. Neftekhimiia 2 no.1:91-99 Ja-F '62. (MIRA 15:5)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut po pererabotke nefti i gaza i polucheniyu iskusstvennogo zhidkogo topliva.
(Alcohols) (Esters) (Olefins)

DEBI, M.K.[Debie, N.G.] inzh. Laureat Gosudarstvennoy premii; IORGA, Dumitru[translator]; RAPOPORT, I.B., doktor khim. nauk, red.; BABUSHKINA, S.I., ved. red.; YAKOVLEVA, Z.I., tekhn. red.

[Petroleum chemical technology; processes of petroleum chemical synthesis] Neftekhimicheskaia tekhnologiia; protsessy neftekhimicheskogo sinteza. Pod red. I.B. Rapoporta. Moskva, Gostoptekhizdat, 1963. 531 p. Translated from the Rumanian. (MIRA 16:11)
(Petroleum chemicals)

KHEYFETS, Ye.M.; KOLOVIKOVA, N.V.; [illegible], R.N.; ZEL'VYANSKAYA, Ye.B.; RAPOPORT, I.B.

Obtaining detergents (secondary alkyl sulfates) from olefins. Trudy VNII NP no. 9:81-94 '63. (MIRA 17:6)

RAPOPORT, S.M. (deceased); KHEYFETS, Ye.M.; LENTSNER, R.S.; CHERNYAK, S.M.; RAPOPORT, I.B.

Separating oxygen-containing compounds from their mixtures with hydrocarbons. Trudy VNII NP no. 9:197-213 '63. (MIRA 17:6)

GLADOVA, A.F.; RAPOPORT, I.B.

Oxygen-containing compounds obtained in syn hesis over an iron-copper catalyst. Trudy VNII NP no. 9:213-227 (MIRA 17:6)
(?).

BELOV, Petr Stepanovich; MIKH, V.N., retsenzent; KALECHITS, I.V., doktor khim. nauk, prof., retsenzent; MASHKINA, S.I., red.

[Fundamentals of the technology of petrochemical synthesis] Osnovy tekhnologii neftekhimicheskogo sinteza. Moskva, Khimiia, 1965. 377 p. (MIRA 18:2)

L 54829-65 EPF(c)/EWT(m)/EWP(j)/T Pr-4/Pc-4 RM

ACCESSION NR: AP5014945 UR/0065/65/000/006/0005/0010
66.092.14:542.973

AUTHORS: Klevtsova, V. P.; Rapoport, I. B.; Vselyubskiy, S. B.

TITLE: Synthesis of hydrocarbons with oxygen-containing compounds from CO and H_2 above the iron-copper catalysts

SOURCE: Khimiya i tekhnologiya topliv i masel, no. 6, 1965, 5-10

TOPIC TAGS: hydrocarbon, hydrocarbon conversion, synthetic hydrocarbon, synthesis property, oxygen compound, hydrogen, catalysis, catalyst carrier, catalytic activity/VTI gas testing device, TsIATIM 51 gas testing device

ABSTRACT: Precipitation of Fe-Cu catalysts (with a high content of metallic iron) and their behavior during the synthesis of products from CO + H_2 were studied to determine the role of the metallic iron in the high volumetric rate synthesis. The catalyst precipitates were reduced at 450C until their content of metallic iron was 94-99%. They were tested in a continuous flow device with and without residual gas circulation. Temperature, pressure, the fresh gas consumption, and the quantity of waste gas were measured at definite time intervals. Residual gas and the propane-butane fraction were analyzed in the VTI and the TsIATIM-51 gas

Card 1/4

L 54829-65
ACCESSION NR: AP5014945

testing devices. Different distillates were obtained from the liquid products and were analyzed for their content of alcohols, acids, esters, carbonyl, and unsaturated compounds. Variation in the catalytic activity of a Fe-Cu-Mn-potash agent was observed with the change in the amounts of its components. Best results were obtained with 100Fe : 2Cu : 4Mn : 0.75K_2O, producing 92 g/m^3 CO + H_2 of liquid and 45 g/m^3 CO + H_2 of gaseous hydrocarbons at 295C and 87% Co transformation. At 5% Cu the production of liquid hydrocarbons dropped to 61 g/m^3; at 1.2% K_2O the CO transformation dropped to 52% and the yield of liquid hydrocarbons to 35%. The effect of the catalyst reduction temperature on its activity is shown graphically in Fig. 1 on the Enclosure, that of the reduction time on the yield of the synthetic product in Fig. 2. With the increase in the reduction temperature from 450 to 800C, the specific surface of the catalyst decreased from 30 to 5 m^2/g because of pore fusion. This decrease in the adsorptive properties resulted in the formation of mostly gaseous hydrocarbons, reducing drastically the production of liquid ones. Orig. art. has: 5 tables and 3 figures.

ASSOCIATION: VNII NP

SUBMITTED: 00 ENCL: 02 SUB CODE: OC

NO REF SOV: 008 OTHER: 006

Card 2/4

L 54829-65

ACCESSION NR: AP5014945

ENCLOSURE: 01

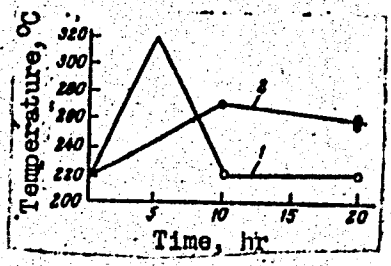

Fig. 1. Temperature variation in a layer of catalyst with respect to the time of its activity (from the beginning of synthesis). Temperature of catalyst reduction, °C: 1- 450; 2- 600

Card 3/4

KAGAN, L.Kh.; KLYACHKO-GURVICH, A.L.; RAPOPORT, I.B.; RUBINSHTEYN, A.M.

Effect of the conditions of the reduction of iron-copper catalysts on their physicochemical properties. Khim. i tekh. topl. i masel 10 no.3:14-16 Mr '65. (MIRA 18:11)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut po pererabotke nefti i gazov i polucheniyu iskusstvennogo zhidkogo topliva.

MOSHKIN, F.A.; RAPOPORT, I.B.; SOSKIN, M.A.

Processing of oxidates in the production of synthetic fatty acids without the use of alkalies and sulfuric acid. Khim. i tekh. topl. i masel 10 no.7:27-32 Jl '65. (MIRA 18:9)

ITSIKSON, L.B.; MEDOVIKOVA, N.Ya.; KHEYFETS, Ye.M. [deceased]; [illegible]

Use of type NaA synthetic zeolites in the drying of alcohols.
Khim. i tekh. topl. i masel 10 no.8:25-27 Ag '65. (MIRA 18:9)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut po pererabotke nefti i gazov i polucheniyu iskusstvennogo zhidkogo topliva.

RAPOPORT, I.B.; ZHAROVA, Ye.Ya.; VELIZAR'YEVA, N.I.; GRYAZNOVA, N.N.; GUBENKO, I.B.; MASHKIN, P.A.

Fatty alcohols from the products of oxidation of solid paraffins. Khim. i tekh. topl. i masel 10 no.12:18-22 D '65.

(MIRA 19:1)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut po pererabotke nefti i gazov i polucheniyu iskusstvennogo zhidkogo topliva.

L 12915-66 EWT(m)/T DJ

ACC NR: AP6000960 SOURCE CODE: UR/0286/65/000/022/0042/0043

AUTHORS: Rapoport, I. B.; Moshkin, P. A.; Belizar'yeva, N. I.; Ivanova, Ye. A.; Zakharova, K. S.

ORG: none

TITLE: A method for obtaining synthetic lubricating oils. Class 23, No. 176350

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 22, 1965, 42-43

TOPIC TAGS: lubricant, ester, carbon, synthetic material

ABSTRACT: This Author Certificate presents a method for obtaining synthetic lubricating oils representing esters of two-base acids. A mixture of two-base acids with the number of carbon atoms exceeding 11 is used as the two-base acids. The carbon atoms are obtained from the C_{17}—C_{20} fraction of synthetic fatty acids.

SUB CODE: 11/ SUBM DATE: 06Feb64

UDC: 665.582

Card 1/1

VAYNSHTEYN, B.P.; KRUGLIKOV, V.Ya.; RAPOPORT, I.B.; VASIL'YEVA, Z.A.; KAGAN, L.Kh.; PLOKHINSKAYA, Ye.A.; VOLYNSKIY, A.V.; MUZOVSKIY, V.V.; KLEVTSOVA, V.P.; Prinimali uchastiye: MICHAN, A.I.; KONOVAL'CHIKOV, L.D.; AYNSHTEYN, V.G.; KVASHA, V.B.; CHELYANOVA, D.P.; ZAYTSEVA, A.F.; ANDREYEVA, T.A.

New way to synthesize oxygen compounds from carbon monoxide and hydrogen over iron-copper catalysts. Trudy VNII NP no. 9:177-196 '63. (MIRA 17:6)

ACC NR: AP7002569 (A,N) SOURCE CODE: UR/0413/66/000/023/0061/0062

INVENTOR: Fal'kovskaya, A. A.; Oberfel'd, M. Sh.; Kheyfets, Ya. M.; Rapoport, I. B.; Puchkov, N. G.; Borovaya, M. S.; Reznikov, V. D.

ORG: none

TITLE: Improving the antiseizure and anticorrosion properties and thermal oxidative stability of lubricants. Class 23, No. 189109 [announced by All-Union Scientific Research Institute for Petroleum Refining (Vsesoyuznyy nauchno-issledovatel'skiy institut po pererabotke nefti)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 23, 1966, 61-62

TOPIC TAGS: lubricant, EP property, anticorrosion additive, thermal oxidative stability, xanthate additive, lubricant additive

ABSTRACT:

An Author Certificate has been issued for a method for improving the antiseizure (EP) and anticorrosive properties, and thermal oxidative stability of lubricants. The method provides for the addition to the lubricants of xanthates of the formula ROCSSR', where R and R' are higher and branched alkyl radicals.

SUB CODE: 11/ SUBM DATE: 02Jul65/ ATD PRESS: 5112

Card 1/1 UDC: 621.892.84

RAPOPORT, I. D.

USSR/Nuclear Physics - Ionization Chamber Counters

11 May 50

"Investigation of the Properties of a Crystallic Ionization Chamber of AgCl," L. A. Geraseva, I. D. Rapoport, I. S. Shapiro, I. G. Sheynker, Moscow State U imeni Lomonosov, 4 pp

"Dok Ak Nauk SSSR" Vol LXXII, No 2

Presents integral curves describing distribution of pulses according to magnitude, obtained in irradiating AgCl crystals with gamma rays from Co^{60} and with beta-particles from P^{32}. Shows fall in effectiveness of counter in connection with polarization of crystal during prolonged irradiation. Submitted 10 Mar 1950 by Acad D. V. Skobelt'syn.

PA 160T81

[illegible], I. [illegible].

Mbr., Physics Inst. im. P. N. Lebedev, Dept. Physico-Math. Sci., Acad. Sci., -1951-.
Physics. Mbr., Sci. Res. Inst. Terrestrial Magnetism, Moscow State Univ., -1951-.
"Spectrum of Ionizations of Particles in the Soft and Hard Components of Cosmic Rays," Dok. AN, 77, No. 4, 1951.

RAPOPORT, I. D

USSR

537.591.1

4660. Ionization spectrum of cosmic-ray particles in the stratosphere. N. L. GRIGOROV, I. D. RAPOPORT AND G. P. SHIPULO. *Dokl. Akad. Nauk SSSR*, 91, No. 3, 491–4 (1953) *In Russian.* English translation, *U.S. National Sci. Found. NSF-tr-123.*

The ionization spectra for the soft and hard components of the cosmic rays at balloon altitudes have been measured using an ionization chamber in coincidence with counters. Curves are given showing the increase in ionization with altitude. R. ELLIOT

Rapoport I. D.

600 - eml

4725

IONIZATION SPECTRA OF PARTICLES OF COSMIC RADIATION IN THE STRATOSPHERE. I. D. Rapoport. (Lomonosov Moscow State Univ.) Izvest. Akad. Nauk S.S.S.R. Ser. Fiz. 19, 519-24(1955) Sept.-Oct. (In Russian)

Measurements of cosmic ray intensities according to the number of charged particles and study of the ionization created by these particles in the stratosphere indicated the presence of a well defined beam of ionized particles which contribute ½ to the total ionization. Experiments were made (for finding the origin of these strongly ionizing particles) to determine the spectrum of cosmic ray particles according to the ionization created by them. These works were carried out during the years of 1951 to 1953 in Moscow at the local latitude. Two variations of experiments were used, in the first the investigation of vertical particle beams with the range larger or equal to 1.7 g cm^{-2}, and in the second, ionization impulses were registered independently from the range or direction of the particle motion with the minimum registration limit of 0.4 order and mean impulse created by a relativistic particle. Both experiments were carried out simultaneously at the same installation with a small, spherical, thin-walled aluminum ionization chamber with gas volume (spectrochemically pure argon) of 8 l and with an impulse collecting time of ~ 5×10^{-4} sec for the electronic component. (R.V.J.)

eml RV

GRIGOROV, N.L.; RAPOPORT, I.D.

Stabilizing the gas amplification coefficients of proportional counters. Prib. i tekh. eksp. no.1:60-64 Ja-F '57. (MLRA 10:6)

1. 2-y Nauchno-issledovatel'skiy fizicheskiy institut Moskovskogo gosudarstvennogo universiteta im. M.V. Lomonosova.
(Nuclear counters)

SOV/120-58-6-14/32

AUTHOR: Rapoport, I. D.

TITLE: An Amplitude Pulse Integrator (Impul'snyy amplitudnyy integrator)

PERIODICAL: Pribory i tekhnika eksperimenta, 1958, Nr 6, p 75 (USSR)

ABSTRACT: The summation of the amplitudes of a train of successive pulses can be done by adopting the following principle. Each input pulse (signal) is transformed into a "packet" of identical pulses; the transformation is done in such a manner that the number N of pulses in the packet is uniquely determined by the amplitude V_a of the input signal. The number of pulses in the packets is registered by a counting device and, since N is proportional to V_a, the recorded count is equivalent to the summation of the amplitudes. Simultaneously, another counter is employed which records the number of packets. From these measurements it is possible to determine the average value of N and the average value of the amplitude of the input signal, that is, $\overline{V}_a = a + b\overline{N}$. This principle was used by the author for the recording of the average value of the amplitude of pulses

Card 1/2

An Amplitude Pulse Integrator

occurring at a rate of about 10 per minute; the pulses were obtained from an ionisation chamber while measuring the average ionisation coefficient of the cosmic radiation particles at sea level. The paper contains 1 Soviet and 1 English reference; the Soviet reference is translated from English.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki MGU (Scientific Research Institute of Nuclear Physics of the Moscow State University)

SUBMITTED: December 23, 1957.

Card 2/2

SOV/120-58-6-25/32

AUTHORS: Grigorov, N. L., Rapoport, I. D., Murzin, V. S., Savin, F.D.

TITLE: A Registering Device for the Amplitude Recording of 49 Pulses of a Large Dynamic Range (Registrator dlya amplitudnoy zapisi 49 impul'sov s bol'shim dinamicheskim diapazonom)

PERIODICAL: Pribory i tekhnika eksperimenta, 1958, Nr 6, pp 109-110, (USSR)

ABSTRACT: The instrument is used for the recording of pulses whose duration is longer than 3×10^{-5} sec. It consists of 49 miniature oscillographic tubes, type 8L029, the screens of which can be photographed onto a single frame. The tubes occupy a square area, having dimensions of 64 x 64 cm. The circuit of a tube is as shown in the figure on p 110. It is seen that, apart from the voltage supplies, the circuit contains an amplifying stage; this has a gain of 38 and gives a

Card 1/2

A Registering Device for the Amplitude Recording of 49 Pulses of a Large Dynamic Range

rise time of 30-40 μ sec. The paper contains 1 figure and 1 Soviet reference.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki MGU (Scientific Research Institute for Nuclear Physics of the Moscow State University)

SUBMITTED: December 23, 1957.

Rapoport I. D.

AUTHORS: Grigorov, N. L., Murzin, V. S., Rapoport, I. D. 56-2-33/51

TITLE: A Method for the Measurement of the Energy of Particles In a Range Above 10^{11} eV (Metod izmereniya energii chastits v oblasti vyshe 10^{11} eV)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1956, Vol 34, Nr 2, pp 506-507 (USSR)

ABSTRACT: More than 2 years ago Grigorov suggested a method for the determination of the energy of a single nuclear-active particle. This method is based on the measurement of the total energy emission in a dense medium by all secondary particles which had been formed on the passage of the primary particle through a thick layer of substance. A formula for the energy E_0 of the primary particle is given. The authors carried out experiments with a specially designed apparatus at altitude of 3960 m above sea level. The present work gives a short description of this apparatus. It consists of a step-pyramid of a height of 170 cm the upper cross section of which is about 0,6 m^2 and the lower cross section about 0,9 m^2. In this pyramid there are 8 iron layers of a total

Card 1/3

A Method for the Measurement of the Energy of Particles In a Range Above 10^{11} eV

56-2-33/51

thickness of 85 cm. In the selection of the absorbent a compromise between the following demands must be found: a) The range of the electron-photon avalanche must be greater than the range of nuclear reaction. b) The material of the absorbent must be sufficiently dense. For the measurement of the ionization cylindrical impulse ionization chambers of iron or brass with walls 1 mm thick are used in this apparatus. These chambers are filled with pure argon at a pressure of up to 5,5 at. excess pressure. The ionization chambers are mounted in 6 series between the iron layers of the apparatus. Altogether the apparatus contains 105 chambers. 3 chambers each are connected to an amplifier. The electric impulses forming the ionization chambers are registered by photographing the screens of all tubes. Besides the ionization chambers the apparatus contains a telescope consisting of counters as well as several casings with hodoscopic counters. The control of the apparatus is shortly described. The minimum ionization still registered corresponds to the simultaneous passage of 5-10 relativistic particles through the chamber. Several examples of registered cases are shown in a diagram. An exact description

Card 2/3

A Method for the Measurement of the Energy of Particles In a Range Above 10^{11} eV 56-2-33/51

of the results obtained with this apparatus will be published later. There are 2 figures.

ASSOCIATION: Moscow State University (Moskovskiy gosudarstvennyy universitet)

SUBMITTED: October 25, 1957

AVAILABLE: Library of Congress

1. Particles-Energy-Measurement

Card 3/3

AUTHOR: Rapoport, I.D. 56-34-4-34/60

TITLE: ~~The Photographic Method~~ of Detecting Dense Showers of Charged Particles (Fotograficheskiy metod detektirovaniya plotnykh livney zaryazhennykh chastits)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol. 34, Nr 4, pp. 998-1000 (USSR)

ABSTRACT: The spectrum of the radiation of most luminophores used in practice for the recording of charged particles usually agrees with the range of such wavelengths as are the most active for photosensitive materials (λ = 3500 to 4500 Å). This circumstance can be utilized for the detection of the showers of charged particles (especially of electron-nucleon showers which are formed in nuclear processes of high energy) by direct contact photography of the scintillators excited by the current of the shower particles. Such a possibility can be realized if the density of the impinging particles suffices for the generation of a sufficiently powerful light energy current on a surface unit of the photolayer. This light energy current must be more powerful than the

Card 1/3

sensitivity threshold. The detector suggested is suited for the experimental investigation of the interaction between cosmic radiation of very high energy and matter. For the purpose of making this possible various luminescent materials were used. Besides the anorganic phosphors (which are activated with thallium), also plastic luminophores (anthracene, terphenyl in polystyrene) are used, which are suited for the production of detectors with large surfaces. The shower was imitated by means of a collimated electron beam (diameter of the collimeter 3 mm) of the radioactive sources P^{32} and Sr^{90}. The beam was directed in a vertical position on to the surface of the luminophore and a photographic emulsion was in close contact with the luminophore. The best effect was attained by fixing the photofilm between 2 thin luminescent layers. When recording the particles by means of such a system a lower boundary value of $\sim 1{,}5{,}10^4$ was attained. The luminescence with the shortest wave was found to be the most active. With increasing density of the particles also the density of blackening increases in accordance with the characteristic blackening curves of the photomaterial . Previous calibration of the detector makes it possible to determine the

The Photographic Method of Detecting Dense Showers of Charged Particles

56-34-4-34/60

density and number of the particles in the recorded shower. The great photographic "width" of modern highly sensitive photographic materials ($\sim 10^3$) and the possibility of simultaneously using several films of different sensitivity provides for a practically infinite measuring range. In practice, the best results may be expected from a detector consisting of a set of several luminescent and photographic layers which are in contact and alternate with one another. Such a detector is also suited to be used as an indicator for electron-nuclear showers which are produced in dense matter by particles of excessively high energy. In conclusion the author thanks N.L.Grigorov for his valuable advice. There are 3 references, 2 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: December 13, 1957

AVAILABLE: Library of Congress

Card 3/3 1. Particles--Detection

AUTHOR: Rapoport, I. [illegible] 56-56-5-51/61

TITLE: On Some Sources of the Low Energy Electron-Photon Component of the Cosmic Rays in the Stratosphere (O nekotorykh istochnikakh elektronno-fotonnoy komponenty maloy energii v sostave kosmicheskogo izlucheniya v stratosfere)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1956, Vol. 34, Nr 5, pp. 1308-1309 (USSR)

ABSTRACT: A comparison of the results of previous experiments (mentioned by the author) leads to the following conclusion. In the vicinity of the value [illegible] I_{excess} (observed in an altitude of [illegible]-19 km) these previous results cannot be explained by a beam of intensely ionizing protons and heavier particles produced in nuclear spallations. $I_{excess} = I - k_p N$ denotes the "excess ionization", k_p - the average ionizing capacity of the relativistic particles and N the number of particles ($cm^{-2}sec^{-1}$). The investigation of small ionization shocks observed at a very low registration threshold ($\sim$[illegible] of the average ionization produced by the relativistic particles) makes it possible to separate the flux of the particles which

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make up this part I_{excess}. These particles may be identical with the low energy electrons which cause the excess ionization I corresponding to the multiple scattering. The flux N_{el}^{excess} of these short-range electrons ($R < 1.7$ g cm^{-2}) amounts to ~20 % of the total flux of charged particles in a height of 19 km. The height dependence of this component is characteristic of the secondary radiation. The particle flux $N_{electron}$ beginning to increase from the upper end of the atmosphere has a maximum in a height which corresponds to 60-65 g/cm^2 and then with increasing depth it decreases monotonously and exponentially, with the index $1/\mu$ = 140 g/cm^2. The energy $E_{electron}$ scattered by this flux in the atmosphere may be found with the equation $E_{electron}$ [illegible] $E_{excess} + E_n N_{electron} \sim$ ~ I'_{excess}. The neutron flux in the atmosphere may cause the reactions (n, n), (n, p) and (n, [illegible]) on the nuclei of the air where the excited nuclei N^{14}, C^{14}, B^{11} are produced. In the absorption of slow electrons in the atmosphere the reaction $N^{14}(n, p)C^{14}$ (which produces β-active C^{14}) predominates. [illegible]

[illegible]

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0013442

On Some Sources of the Low Energy Electron-Photon Component of the Cosmic Rays in the Stratosphere

the flux of the secondary protons some reactions on the nucleus N^{14} (which produce excited and β-active final nuclei) are possible. The total energy contribution made by the processes discussed in this paper to the production of electrons and photons with low energies may be determined when data concerning the density of generation of neutrons in the atmosphere are available. According to the available data ~20 - 30 % (with respect to energy) of the short range electrons ($R < 1,7$ g/cm^2) are in a genetic connection with the products of the nuclear spallations. There are 1 figure, 1 table, and 25 references, 8 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)
SUBMITTED: December 30, 1957

1. Cosmic rays--Properties 2. Electrons--Sources 3. Photons --Sources

RAPOPORT, I. D.

STUDY OF INTERACTION PROCESSES OF [illegible] - 10^{12} ev PARTICLES WITH IRON AND GRAPHITE NUCLEI

Kh. P. Mabayan, N. L. Grigorov, M. M. Dubrovin,
V. S. Murzin, V. A. Sobinyakov, and I. D. Rapoport

1. The use of the "ionization calorimeter" which comprises a large number of ionization chambers made it possible to investigate the interaction of particles of known energy.

2. Studies carried out in 1957 at 3860 m above sea level and in 1958-59 at 3200 m above sea level have produced results that are in good agreement. From theseresults, the following conclusions may be drawn:

a) when interacting with Fe nuclei, 10^{11}-10^{12} ev particles lose, as a rule, nearly all their energy in the production of mesons:

b) there is a large probability that as a result of collision with a nucleus there are produced a small number of particles, the total energy of which amounts to ~50% of the energy of the primary particle (in the majority of cases these particles are not nucleons):

c) big fluctuations are observed in energy transfer to π^0-mesons.

Report presented at the International Cosmic Ray Conference, Moscow, 6-11 July 1959.

SOV/120-59-4-18/50

AUTHOR: Rapoport, I. D.

TITLE: A Hodoscope with Sequential Signal Transmission

PERIODICAL: Pribory i tekhnika eksperimenta, 1959, Nr 4, pp 86-90 (USSR)

ABSTRACT: Two instruments for recording and transmitting the signals from trays of counters are described; in one the signals are recorded by neon indicators, and in the other by hard-valve circuits (Figs 1 and 2 respectively). The circuits are designed to be extremely economical in current (they are meant for use in stratospheric balloons). Fig 1 shows one unit designed for use with 30 counters, in which one cycle of recording takes 20 msec; it is stated that the circuit can be modified to require only 100μsec per channel. The individual channels have a resolving time of about 10^{-5} sec. The second unit (Fig 2) uses heptodes connected in a Kipp relay circuit to record the pulses (these heptodes replace the neon lamps of Fig 1). These heptodes are also used to transmit the signals. Fig 3 shows the voltage waveforms appearing at various

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A Hodoscope with Sequential Signal Transmission

points in the circuit of Fig 2; the time scale (in μsec) is shown at the top, with the control signal at the extreme left. The description relates mainly to the detailed functioning of the circuits, but, since the parameters of the valves are not given, and the description concerns general principles rather than exact valves, it is not possible to summarize the description in a reasonable form. The paper contains 3 figures and 16 references, 14 of which are Soviet and 2 English.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki MGU (Nuclear Physics Research Institute at Moscow State University)

SUBMITTED: May 25, 1958.

21(7) SOV/56-36-4-6/70

AUTHORS: Grigorov, N. L., Murzin, V. S., Rapoport, I. D.

TITLE: Investigation of the Interaction of Particles With Energies of 10^{11} - 10^{12} ev With Iron Nuclei (Izucheniye vzaimodeystviya chastits s energiyey 10^{11} - 10^{12} eV s yadrami zheleza)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 4, pp 1068-1079 (USSR)

ABSTRACT: The present detailed paper consists of 7 sections. Section 1 in its introduction discusses the problem and the measuring method. The energy of a primary particle E_0 is determined according to a new method from the ion pair production energy ε and the ionization $I(x)dx$ generated in an absorber layer of the thickness dx g/cm^2 in the depth x g/cm^2, if x_0 is the total thickness of the absorber. It holds that $E_0 = \varepsilon \int_0^{x_0} I(x)dx$. The principle of the device used has already been described by reference 2. Energy determination was carried out by calorimetric measurements, and therefore the device is described as "ioni-

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Investigation of the Interaction of Particles With Energies of 10^{11} - 10^{12} ev With Iron Nuclei

zation calorimeter". Measurements were carried out at an altitude of 3860 m above sea level. Section 2 of the paper describes the apparatus. The ionization calorimeter consisted essentially of a large block of 7 iron layers of various thicknesses, between which 6 rows of pulse ionization chambers were arranged. Batches of 3 of these chambers were connected in parallel and formed an ionization detector; each detector was connected with a pulse amplifier. The device contains a total of 105 ionization chambers which formed 35 independent ionization detectors. Figure 1 is a schematical representation of the device. Section 3 deals with the evaluation of measuring results. It is discussed in short how the ionization chamber pulses are photographed by means of a multi-channel oscillograph on a cinematographic film. Each film is radiotechnically gauged. The pulse amplitudes and ionization are determined and diagrams similar to that of figure 2 are made. They serve the purpose of determining the angle of incidence of the "primary" particles. In section 4 measuring results are discussed, which are given in detail by a table. The table con-

Investigation of the Interaction of Particles With Energies of 10^{11} - 10^{12} ev With Iron Nuclei

tains data concerning particle energy $(0.5 \div 46) \cdot 10^{11}$ ev, the angles of incidence ($0 \div 25^0$ to the vertical), the place of the first interaction of primary particles ($0 \div 300$ g/cm^2), the number of particles in the first maximum ($40 \div 18000$) and in the second maximum (up to 1500), and, finally, the number of accompanying electrons (between 1 and ~30). A total of 110 cases was analyzed in which, behind 2 arbitrary rows of chambers, more than 250 relativistic particles occurred. Section 5 discusses results. Figure 3 shows an example of a nuclear cascade curve in form of a diagram in which the number of electrons is plotted to the absorber thickness. Figure 4 shows the dependence of the absorber layer thickness on the number of interactions. For the interaction range a value of $L = 92^{+20}_{-12}$ g/cm^2 was calculated which is a near approach to the value corresponding to a geometrical nuclear cross section of $r_0 = 1.4 \cdot 10^{-13}$ cm ($L_{geom} = 105$ g/cm^2). Investigation of the average inelasticity $\bar{\alpha}$ in the interaction of nuclear-active particles of 10^{11}-10^{12} ev

SOV/56-56-4-16/70

Investigation of the Interaction of Particles With Energies of $10^{11} - 10^{12}$ ev With Iron Nuclei

was carried out by an analysis of the curves of the average ionization $\bar{I}(x)$ in Fe in the case of a given E_0. The theoretical considerations necessary for determining $\bar{a}$ are given. $\bar{a}$ is between 0.75 and 1. In section 6 the fluctuations of the energy part transferable by neutral pions are investigated (Fig 6). The mean energy transmitted by π^0-mesons is given as amounting to ~0.4 ± 0.1 of primary particle energy. Section 7 finally deals with the results obtained by determining the energy flux absorption of nuclear-active particle energy at great iron layer thicknesses. Determination was carried out by means of the ionization curve. The energy flux decrease of this component developed very slowly with increasing depth; for the absorption range $L_{abs} = 240$ g/cm^2 is given and a correction made in consideration of neutrons even gives a value of 270 g/cm^2. The authors finally thank V. S. Kaftanov, Yu. G. Yelkin and V. I. Lebedenko for their collaboration. There are 7 figures, 1 table, and 6 references, 4 of which are Soviet.

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SOV/56-36-4-16/70

Investigation of the Interaction of Particles With Energies of 10^{11} - 10^{12} ev With Iron Nuclei

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University)

SUBMITTED: November 4, 1958

Card 5/5

24,6810

82887
S/120/60/000/02/018/052
E192/E382

AUTHORS: Rapoport, I.D. and Goryunov, N.N.

TITLE: A Hodoscope Based on Semiconductors

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, No 2, pp 72 - 74 (USSR)

ABSTRACT: A detailed circuit diagram of the equipment is shown in Figure 1. All the transistors in this device are Soviet-made, type P 13B, while the diodes are of the type D1B. The upper portion of the circuit elements in the figure consists of 25 transistorized gated units; the middle portion contains 25 bistable trigger circuits, while the lower portion contains a univibrator and a blocking oscillator. The bistable circuits are the basic units of the system. The transition of a bistable circuit from the first state of equilibrium into the second steady state is effected by a voltage pulse from a corresponding counter C. The circuit remains in the second steady state till the instant of reading the state of the bistable circuits; it acts therefore as a memory device containing the information relating to a given hodoscopic number. The negative pulses from the counters C are

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applied to the collector circuits of the gated input units. These pulses are almost fully suppressed, if the gating signal Y is absent. When the positive pulse Y is applied, the circuit is unblocked and thus the pulses from C can actuate the bistable circuits. The resolving time for the coincidences between C and Y pulses is of the order of 5 μs. The system operates satisfactorily if the amplitudes of the counter pulses are about 2.5 V and those of the gating pulses are about 0.5 V. The process of signal transmission is initiated by a starting pulse P (Figure 1). This signal actuates a univibrator and opens a blocking oscillator which starts generating a train of positive pulses having an amplitude of 4 V and a duration of 7 μs. The pulses are repeated at intervals of 200 μs. These pulses are applied to the input circuits of all the bistable circuits by means of the diodes (Figure 1). The first pulse returns all the bistable triggers to their original steady state. Consequently, the collectors of these circuits

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produce transients which actuate the neighbouring trigger circuits. In this way successive resetting pulses from the blocking oscillator produce a shifting of the information stored in the trigger circuits. As a result of this operation positive pulses are produced at the output of the last bistable trigger. The hodoscopic channels are arranged in groups of 25, each group being provided with its own blocking oscillator. The output signals of each group are applied to a common output circuit. The blocking oscillator produces 30 pulses, since the monostable multivibrator returns to its steady state after the interval corresponding to 30 periods of the blocking oscillator. There are 1 figure and 5 referemces, 1 of which is English and 4 are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki MGU (Scientific-Research Institute for Nuclear Physics of MGU)

SUBMITTED: March 16, 1959

Card 3/3

85362

S/120/60/000/005/036/051
E032/E314

21.5200

AUTHOR: Rapoport, I.D.

TITLE: Method of Increasing the Sensitivity of Photographic Recording of Dense Showers of Charged Particles

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, No. 5, pp. 130 - 131

TEXT: In an earlier paper (Ref. 1), we described a method of detecting dense showers of charged particles based on contact photography of scintillations produced by electron-nuclear showers generated by ultrahigh energy cosmic rays. This kind of indicator facilitates the detection of high-energy nuclear interaction events investigated with the aid of emulsion chambers and stacks, but is also capable of providing additional information about the density of particles in the shower and their angular distribution. In order to extend this method to the region of lower densities and also to ensure more reliable recording of showers, it may be possible to reduce the detection threshold. In Ref. 1 this threshold was estimated as $\sim 10^4$ relativistic particles (passing through a region of

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~ 0.1 cm radius), which corresponds to an energy of 10^{12} eV of the primary particle initiating the shower. By using suitable materials and improved design, it was possible to reduce the detection threshold very considerably. In the new detector, we employed a high-sensitivity X-ray film (Agfa-Rapid) and a tungstate screen (УФД-2 (UFD-2)) as the phosphor. The X-ray film, which was coated on both sides, was placed between two luminescence screens, tightly pressed against it. Experiments showed that this arrangement increased the sensitivity of the film to fast electrons by an order of magnitude (Fig. 1). According to the calibration curve (Fig.2) for a collimated beam of electrons (10 mm^2 cross-section) obtained from a $Sr^{90}-Y$ source, this system can be used to record showers of ~ 10^3 particles, i.e. with primary particle energy in the range ~10^{11} eV. The photorecording layer and the phosphors were in direct contact with a lead filter (thickness

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of the order of one radiation length) which was used to develop the electron-photon shower initiated by high-energy photons (electrons) incident on the filter, or produced inside the filter by a nuclear-active particle. The high atomic number and the high density of the medium ensured a high particle flux and small shower radius. This detector can be incorporated as a useful component in emulsion chambers.
There are 2 figures and 1 Soviet reference.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki MGU (Scientific Research Institute of Nuclear Physics, Moscow State University)

SUBMITTED: September 21, 1959

Card 3/3

RAPPOPORT, I.D.

S/058/61/000/010/020/100
A001/A101

AUTHORS: Babayan, Kh.P., Grigorov, N.L., Dubrovin, M.M., Mishchenko, L.G., Murzin, V.S., Sarycheva, L.I., Sobinyakov, V.A., Rappoport, I.D.

TITLE: Investigation of interaction of 10^{11} - 10^{12} ev energetic particles with nuclei of iron and graphite

PERIODICAL: Referativnyy zhurnal. Fizika, no. 10, 1961, 96-97, abstract 10B506 ("Tr. Mezhdunar. konferentsii po kosmich. lucham, 1959, v. 1", Moscow, AN SSSR, 1960, 176 - 182)

TEXT: The authors present the results of an investigation, carried out by means of an ionization calorimeter, of interactions of 10^{11}-10^{12} ev particles with nuclei of iron and graphite on the Aragats mountain (3,200 m above sea level). It is shown that: 1) Coefficient of inelasticity of interaction of particles with energy $E_0 \geq 2 \times 10^{11}$ ev with iron nuclei $\overline{\alpha}_{Fe} = 1.0 \pm 0.09$; 2) In the interaction with the iron nucleus of a 2×10^{11} ev nucleon, one energetically outstanding particle is produced with average energy of $\sim E_0$, probability of this occurrence being close to unity; most probable this particle is a π-meson; 3) The mean coefficient of inelasticity of interactions of particles with $E_0 > 10^{11}$ ev

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A001/A101

Investigation of interaction ...

with carbon nuclei $\bar{\alpha}_C \leq 0.5\bar{\alpha}_{Fe}$; 4) the experimental data obtained for $\bar{\alpha}_{Fe}$ and $\bar{\alpha}_C/\bar{\alpha}_{Fe} \leq 0.5$ rule out the possibility of consecutive collisions with individual nucleons of the nucleus (or small groups of nucleons) at interactions of particles with energies $\geq 10^{11}$ ev with heavy nuclei; 5) in the energy range of nucleons $10^{10} - 10^{11}$ ev the interaction with heavy nuclei changes its nature.

L. Dorman

[Abstracter's note: Complete translation]

Card 2/2

33143
S/120/61/000/006/009/041
E039/E485

21.6000

AUTHORS: Goryunov, N.N., Rapoport, I.D.

TITLE: A hodoscope system using magnetic elements

PERIODICAL: Pribory i tekhnika eksperimenta, no.6, 1961, 59-61

TEXT: A hodoscope system is described which uses ferrite-transistor elements and hence is small and light with a low energy consumption. It is designed for use with a very large number of Geiger counters (10^3 to 10^4). The circuit shown in the figure is one section of the apparatus which operates with 20 channels. There are two basic processes: the recording and subsequent reading of the hodoscope signals. The record is produced on toroidal ferrite cores which have a rectangular hysteresis loop. The speed of the system is determined by the maximum permissible rate of reading and is limited by the time constant of the circuits coupling the cores. At L_i = 100 μh, C_i = 0.02 μf, the permissible reading frequency is about 50 kc. It is practicable to vary the values of L_i and C_i in the circuit, with the given triodes and cores, to bring the frequency up to about 100 kc. The construction is economical, it is claimed to require only half the number of components per

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A hodoscope system using magnetic ...

channel compared with previous circuits. Maintenance is simple and, with a proper preliminary selection of ferrite cores, individual tuning of the channels is not required. The supply voltage is not critical and the power consumption per section of 20 channels is about 9 milliwatts. Operation is possible in the temperature range -30 to +50°C. There are 1 figure and 5 Soviet-bloc references.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki MGU (Scientific Research Institute of Nuclear Physics MGU)

SUBMITTED: February 23, 1961

Card 2/2

RAPOPORT, I. D.

33316
S/560/61/000/010/014/016
D299/D302

11,1570

AUTHORS: Grigorov, N. L., Zhuravlev, D. A., Kondrat'yeva M. A., Rapoport, I. D., and Savenko, I. A.

TITLE: Search for antimatter in cosmic radiation and space

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli. no. 10. Moscow, 1961, 96-97

TEXT: An emulsion flask--containing 489 emulsion layers of type BP (BR), size 10 x 10 cm^2, thickness 400 μ--was placed on the 2nd Soviet Sputnik. The flask was exposed for about 24 hours at an altitude of 300 km. Brought back to earth, the flask was chemically treated and then analyzed. The analysis was carried out by means of the microscope МБИ-2 (MBI-2) with total magnification 105. Thereby, the multi-charge nuclei and "stars" created by tnese nuclei, which were stopped in the

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Search for antimatter...

emulsion, were observed. In a volume of 656 cm^3 of emulsion, 442 ordinary nuclei were found, as well as 320 "stars." None of the "stars" possessed the characteristics pertaining to annihilation of multi-charge particles which come to rest. Assuming that antinuclei have the same energy spectrum as ordinary nuclei, and taking into consideration that out of 442 multi-charge nuclei not a single anti-nucleus was found, it follows that the fraction of antinuclei with $Z > 2$ in cosmic radiation does not exceed 0.23% of ordinary nuclei of the same charge. A similar result was obtained by D. M. Haskin et al (Ref. 1: Trudy Mezhdunarodnoy konferentsii po kosmicheskim lucham (International Conference on Cosmic Radiation), v. III. Izd-vo AN SSSR, 1960, p. 138). Assuming antimatter to be scattered in the solar system as individual atoms, it is possible to make an upper estimate of antimatter density as follows: The flow of gamma-quanta with energy of the order of 10^8 ev is

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D299/D302

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$J_\gamma \approx 2 \cdot 10^{30} \bar{n}_{\pi^0} \bar{\rho}_a$ cm^{-2} · sec^{-1}, where $\bar{n}_{\pi^0}$ is the mean number of π^0-mesons formed by the annihilation of the anti-nucleus. As an upper (greatly over-rated) estimate for J_γ, it is possible to take a flow of gamma-quanta which would give rise (at geomagnetic latitude 4°) to a charged-particle flow with energy $E \geq 10^8$ ev, provided all the particles are considered as electrons. Hence, $J_\gamma < 10^{-1}$ cm^{-2} sec^{-1}, and $\bar{\rho}_a < \frac{1}{3} \cdot 10^{-31}$ gm · cm^{-3}. Assuming that the density of matter in the solar system is $\bar{\rho} \sim 10^{-24}$ gm · cm^{-3}, one obtains $\frac{\bar{\rho}_a}{\bar{\rho}} < \frac{1}{3} \cdot 10^{-7}$. There are 2 references: 1 Soviet-bloc and 1

Card 3/4

GRIGOROV, Naum Leonidovich; KONDRAT'YEVA, Marina Aleksandrovna; RAPOPORT, Il'ya Davidovich; FRANK, I.M., red.; GRIGOROVA, V.A., red.; PLAKSHE, L.Yu., tekhn. red.

[Cosmic rays]. Kosmicheskie luchi. Moskva, Fizmatgiz. 1962. 83 p. (Praktikum po iadernoi fiziki, no.2). (MIRA 16:4)

1. Chlen-korrespondent AN SSSR (for Frank).
(Cosmic rays)

S/120/62/000/003/016/048
E039/E135

AUTHOR: Rapoport, I.D.

TITLE: Recording the amplitude of pulses from a large number of counters

PERIODICAL: Pribory i tekhnika eksperimenta, no.3, 1962, 75-78

TEXT: Description of an economical system for recording the amplitude of pulses from 1000 radiation detectors. Considered to be the first time an apparatus has been built to handle this number of counters. Commutation is achieved by means of a circuit containing mechanical and electronic switches. Electronic switches are used for switching grouped channels; for the separate groups mechanical commutators of small volume with 100 to 200 segments are used. The circuitry and its operation are described in reasonable detail. The amplification characteristic of the preamplifiers consists of two linear sections, i.e. first part linear up to 5 volts input (40 volts output) and the second part continues linearly up to ~ 100 volts input and output. Automatic control of sensitivity is achieved by the use of control signals of fixed amplitude (5 mV). Analysis of the recorded data

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Recording the amplitude of pulses... S/120/62/000/003/016/048
E039/E135

is simplified by simultaneously photographing with the pulses a standard calibration scale, which permits the counting of results in units of voltage on the input channel or directly in number of charged particles passing through the ionisation chambers. Range of recording amplitudes from 30 to 50 μV up to 100 mV for each counter. Accuracy of amplitude measurement is better than 1%.

There are 2 figures.

SUBMITTED: July 31, 1961

Card 2/2

ACCESSION NR: AR4032154 S/0058/64/000/002/A016/A016

SOURCE: Ref. zh. Fiz., Abs. 2A175

AUTHOR: Rapoport, I. D.; El'kin, Yu. A.

TITLE: Switching unit for 50--100 channels with capacitive coupling

CITED SOURCE: Tr. 5-y Nauchno-tekhn. konferentsii po yadern. radioelektronike. T. 2. Ch. 1. Gosatomizdat, 1963, 63-69

TOPIC TAGS: switching unit, commutator, channel switching unit, selector switch, capacitive coupling, capacitive commutator

TRANSLATION: A mechanical selector switch without wiping contacts has been developed to switch several channels alternately to a single channel. Its principle is based on transmitting pulses from the individual channel to the output recording unit through a capacitive

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ACCESSION NR: AR4032154

coupling, which is alternately connected by the selector switch to all the channels. The experimental setup is designed for 40 switch blades. The stator of the switching unit is made of Plexiglas and contains 40 sections with metallized surfaces. An air capacitor is formed between each section and a metallized track on the surface of the rotor whenever the latter passes through the section. The maximum capacitance produced in this case is 30 pF. The coupling between the pick-off track of the rotor and the output is also capacitive (950 pF). The construction provides for screening and removal of the electric charge which may arise on the surface of the Plexiglas when the rotor turns rapidly. The influence of the cross-coupling networks, of the rotor speed, and of other factors on the accuracy with which the pulse amplitudes are transmitted is analyzed in detail. Calculations and experimental characteristics are presented for the switching unit. The transfer characteristic is linear in an input amplitude range from 0.5 to 450 V. The voltage transfer coefficients of the different channels do not differ by

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ACCESSION NR: AR4032154

more than 5%. Amplitude-transmission fluctuations connected with the instability of the transfer capacitance are lower than 1.5%. The operating speed of this device exceeds by 10--100 times that of contact-making switching units. M. Vishnevskiy.

DATE ACQ: 31Mar64 SUB CODE: SD, EE ENCL: 00

Card 3/3

ACCESSION NR: AP4009625 S/0293/63/001/003/0436/0442

AUTHORS: Grigorov, N. L.; Zhuravlev, D. A.; Kondrat'yev, M. A.; Rapoport, I. D.; Savenko, I. A.

TITLE: Investigation of cosmic radiation beyond the limits of the atmosphere

SOURCE: Kosmicheskiye issledovaniya, v. 1, no. 3, 1963, 436-442

TOPIC TAGS: cosmic radiation, extra-atmospheric cosmic radiation, cosmic radiation measurement, cosmic radiation intensity, cosmic particle ionization

ABSTRACT: Tests conductedon the traces of charged particles in an emulsion, subjected to radiation at a height of 306-339 kilometers, showed that the intensity of the recorded radiation was three times that of primary cosmic radiation. Approximately 50% of the excess particles are nonnuclear-active particles with minimal ionization (in all likelihood, these are electrons). The remaining excess particles are highly ionizing and are the products of nuclear splitting. Fig. 1 of the Enclosure indicates the results of tests carried out with counters on the second cosmic ship, as well as the intensity of cosmic radiation measured by A. N. Charakhch'yan and T. N. Charakhch'yan (A. N. Charakhch'yan, T. N. Charakhch'yan. Zh. eksperim. i teoret. fiz., 35, 1088, 1958). It is pointed out that, although the existence of excess radiation in the form of charged particles

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ACCESSION NR: AP4009625

has been noted in a number of papers dealing with radiation studies at heights of 200-300 km, the nature of this radiation and the mechanism of its formation is not yet clear (that is, whether they are protons of the internal radiation belt or whether these excess particles are genetically related to primary cosmic radiation). On the second cosmic ship a photo-emulsion unit was installed, consisting of 489 layers of emulsion NIKFI"R", 10x10 cm^2, with a layer thickness of 400 microns. Since the emulsion recorded all particles integrally, not discriminating them in terms of time, for purposes of comparison of the emulsion data with the counter-tube data, it was necessary to average the latter for the entire flight time, considering the time the instrument was located at different latitudes and the dependence of radiation intensity on observation site latitude. Emulsion sensitivity was sufficient to provide reliable recording of particles with minimal ionization. The absolute intensity of the particles was determined to ensure that all the particles recorded by the counter-tubes were also recorded by the emulsion. It was found that more than 60% of the emulsion-recorded particles are particles with minimum ionization, while 40% of the particles showed an ionization of $g/g_{min} > 1.4$ (g = grain density). The author explained the technique used to determine what part of the high-ionization particles was formed by nuclear splitting. This method was based on the fact that at various heights in the atmosphere streams of high-ionizing particles under various filters and in the air are identical and proportional to the stream of the star-generating

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ACCESSION NR: AP4009625

component at a given height; that is, to the number of "stars" formed in 1cc of emulsion per unit time. In order to determine the number of stars, three observers were used to inspect an emulsion area of 0.072 cc, with a magnification of 450X. Stars were recorded with a number of grey and black traces $N_h \geq 3$. The authors found 2260 ± 170 stars/cc/day with $N_h \geq 3$; that is, from nuclear splitting one may anticipate 0.25 ± 0.04 particles/cm^2/sec. The author also concluded that protons of the inner radiation belt, incident in an ionization interval $2.4 < g/g_{min} < 7.8$, after passing through the walls of the satellite-ship, may constitute 3 ± 4% of all the particles recorded by the counter. By comparing the number of stars with what would normally be expected on the supposition that the excess particles are protons or other nuclear-active particles, generated by primary cosmic radiation in the substance surrounding the emulsion, the author concluded that the relativistic excess particles are high-energy electrons, and are not nuclear-active. The "grey" traces are the product of nuclear splitting (in their overwhelming mass - by protons), and are not protons of the inner belt. This is to be understood in the light of the fact that, in terms of their specific ionization, excess particles at heights of 200-300 km may be divided into two groups: relativistic ($g/g_{min} \leq 1.4$) and "grey" ($g/g_{min} > 1.4$), with the relativistic comprising 45%, and the "grey" 55% of all excess particles. Inner belt protons, if indeed they are present among the excess particles within the space ship, constitute not more than 4 ± 6% of all excess particles. Most of the excess parti-

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ACCESSION NR: AP4009625

cles (and possibly all of them) are genetically related to the primary cosmic radiation at the point of observation. The authors express their gratitude to V. V. Bobrovskaya and E. A. Orlova for conducting the tests. Orig. art. has: 5 figures.

ASSOCIATION: none

SUBMITTED: 15Jul63 DATE ACQ: 30Jan64 ENCL: 01

SUB CODE: AS NO REF SOV: 005 OTHER: 005

Card 4/5

L 13624-63 EWT(m)/BDS AFFTC/ASD
ACCESSION NR: AP3003101 S/0056/63/044/006/1806/1810

AUTHOR: Grigorov, N. L.; Yerofeyeva, I. N.; Murzin, V. S.; Mishchenko, L. G.; Rapoport, I. D.; Rostomyan, B. O.; Sobinyakov, V. A.; Titenkov, A. F.

TITLE: Energy spectrum of nuclear-active particles at 3260 m above sea level

SOURCE: Zhurnal eksper. i teor. fiziki, v. 44, no. 6, 1963, 1806-1810

TOPIC TAGS: nuclear-active particle spectrum, high energy atomic interactions

ABSTRACT: The energy spectrum of nuclear-active particles at 3260 m above sea level was studied with an ionization calorimeter. The possible distortion of the spectrum by instrumental effects was reduced by adding the ionization in the ten upper rows of chambers. The effect of incidence of groups of nuclearactive particles on the array was avoided by selecting only those events in which one particle strikes the array. Simultaneous passage of several particles through the apparatus was excluded by considering only the events due to nuclear particles without accompaniment in air. A total of 951 events was found in which a sharply delimited core of an electron-nuclear shower was visible in the calorimeter, and the integral energy spectrum of the nuclear-active particles was plotted. In the

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ACCESSION NR: AP3003101

energy range between 200 and 2000 GeV the integral energy spectrum can be approximated by a power law with exponent 1.92, with a statistical error of 5--7% and with a methodological uncertainty of 0.05. It is concluded that in this energy range the exponents of the nuclear-active particle spectrum, the spectrum of bursts from single nuclear-active particles in ionization chambers, and of the energy spectrum of electron-photon cascades produced in nuclear interactions coincide, meaning that the mean inelasticity factor in nuclear interactions remains constant in the energy range under consideration. Orig. art. has: 4 figures and one formula.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics, Moscow State University)

SUBMITTED: 08Jan63 DATE ACQ: 23Jul63 ENCL: 02

SUB CODE: 00 NO REF SOV: 003 OTHER: 002

Card 2/2

L 14277-63 EWT(1)/FCC(w)/FS(v)/EDS/EEC-2/ES(v) AFFTC/ASD/AFMDC/APGC/
ESD-3 Pe-4/Pi-4/Pq-4 TT/GW/JFW
ACCESSION NR: AP3005304 S/0056/63/045/002/0394/0394

AUTHOR: Grigorov, N. L.; Zhuravlev, D. A.; Kondrat'yeva, M. A.; Rapoport, I. D.; Savenko, I. A.

TITLE: Search for antimatter in cosmic rays

84
83

SOURCE: Zhur. eksper. i teoret. fiz., v. 45, no. 2, 1963, 394

TOPIC TAGS: cosmic-ray antimatter, cosmic ray, antimatter, spaceflight

ABSTRACT: On 19 Aug 1960 the Second Ship-Satellite [the "Strelka"-"Belka" flight] was sent into space carrying an emulsion stock of 489 layers of type-BR emulsion 400 μ in total thickness. The open emulsion stock was kept for approximately 24 hr at an altitude of 300 km and later examined with a 105X microscope for the purpose of detecting multiply-charged nuclei stopped by the emulsion and "stars" produced by the nuclei. The emulsion stock was found to have 1079 stopped nuclei of atomic number Z > 2 and 748 "stars", which could not be attributed to the annihilation of stopped antinuclei. It is concluded that the number of antinuclei with Z > 2 in the primary cosmic rays does not exceed 0.1%, at least for the case of low-energy antinuclei.

ASSOCIATION: Institute of Nuclear Physics of Moscow State University.

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L 6653-65 EWG(j)/EWT(l)/EWT(m)/EWG(v)/AR/K/FCC/EEC-4/EEC(t)/T/EWA(h)
Po-4/Pe-5/Pq-4/Pi-4/Pae-2/Pb-4 AFWL/SSD/AFMDC/BSD/AFETR/ESD(gs)/IJP(c)
ESD(t) GW/WS
ACCESSION NR: AP4046778 S/0293/64/002/005/0724/0762

AUTHOR: Grigorov, N. L.; Rapoport, I. D.; Savenko, I. A.; Skuridin, G. A.

TITLE: Some problems and possibilities in the field of cosmic ray research

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 5, 1964, 724-762

TOPIC TAGS: upper atmosphere, cosmic ray, ionization calorimeter, cosmic ray intensity, gamma radiation, photon, photoemulsion

ABSTRACT: In this lengthy paper, the authors discuss basic problems involved in the operation of an ionization calorimeter, an instrument for measuring the energy of cosmic ray particles and the dependence of the principal parameters of the ionization calorimeter on the conditions of its use. Also discussed are the possibilities of the use of the ionization calorimeter for the study of a number of the characteristics of interaction between atomic nuclei and cosmic ray particles with energies of 10^{11}--10^{13} ev, for study of the composition of primary cosmic ray particles with high energies (10^{11}--10^{14} ev) and for the study of the electron component of primary cosmic rays and high-energy gamma radiation. In the introduction it is shown that presently used methods are completely unsuitable for solution of problems involved in the measurement of particle energies up to 10^{15} ev. The ionization calorimeter, proposed by N. L. Grigorov, is regarded as the only pre-

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ACCESSION NR: AP4046778

sently available method for solving this problem; at least in the Soviet Union it has now become the basic tool in cosmic ray research at high-mountain stations. The ionization calorimeter is a flexible tool: with equal accuracy it makes it possible to measure the energy of charged and neutral particles and it can be combined with various other kinds of apparatus, such as Wilson chambers, spark chambers and even nuclear photoemulsions. This is the first detailed description of the ionization calorimeter in the literature. The article is divided into two chapters, each with a number of sections: I. Ionization calorimeter: 1. Principle of operation. 2. Parameters of the ionization calorimeter. 3. Selection of material for the absorber. 4. Methods of recording ionization. 5. Role of nuclear spallations in energy losses and accuracy of measurement of the energy of a single particle. 6. Selection of ionization detectors. 7. Parameters of the ionization calorimeter for work in the upper part of the atmosphere and beyond its limits. 8. Recording of ionization bursts from a large number of detectors. II. Possible applications of the ionization calorimeter: 1. Study of the chemical composition of primary cosmic radiation in the region of high and superhigh particle energies. 2. Study of the characteristics of the nuclear interaction of high-energy primary cosmic particles. 3. Study of elementary nuclear processes by the photoemulsion method. 4. Study of high-energy electrons and photons in primary cosmic rays. The following are among the significant diagrams

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ACCESSION NR: AP4046778

accompanying the text: Fig. 9 -- simple variant of the ionization calorimeter with scintillators for work in the upper part of the atmosphere; Fig. 10 -- apparatus for study of the processes of generation of π^0-mesons by cosmic ray particles with energies of 10^{12}--10^{13} ev by the nuclear photoemulsion method; Fig. 11 -- instrument for registering high-energy electrons in primary cosmic rays; Fig. 12 -- instrument for study of the energy spectrum of primary γ-rays and search for local sources of γ-quanta. Orig. art. has: 85 formulas, 12 figures and 3 tables.

ASSOCIATION: none

SUBMITTED: 09Jun64 ENCL: 00 SUB CODE: AA, NP

NO REF SOV: 017 OTHER: 001

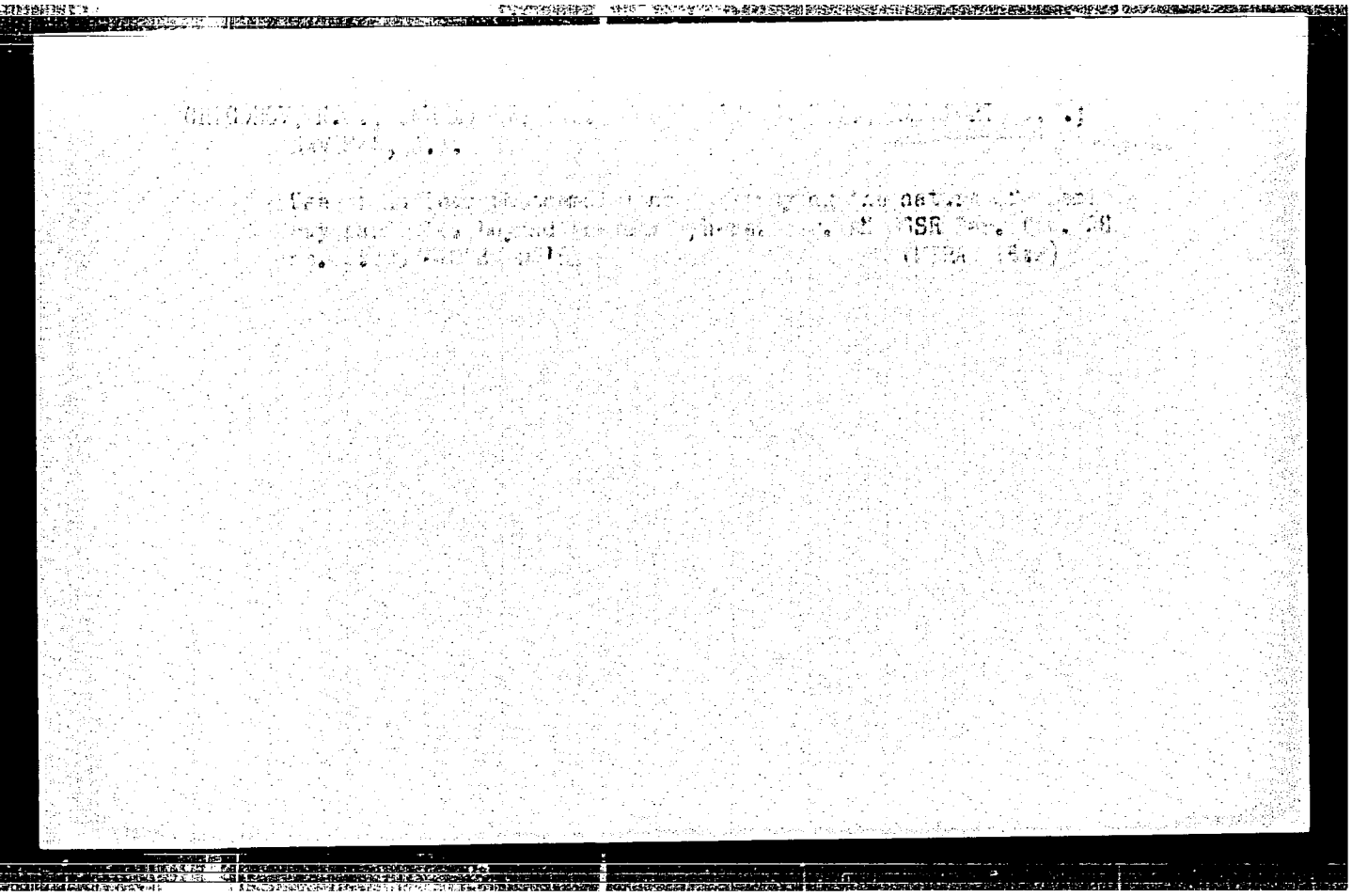
Card 3/3

GRIGOROV, N.L.; YERONEYEVA, I.N., MESHCHERYAKOV, L.S.; MURZIN, V.S.; RAPOPORT, I.D.; SARYCHEVA, L.I.; SOFINYAKOV, V.A.

Interaction paths of nuclear-active particles with energies $\geq 10^{11}$ ev. Izv. AN SSSR. Ser. fiz. 28 no.11:1798-1800 N '64.

Absolute intensity and the energy spectrum of nuclear-active particles at an altitude of 3260 m. above sea level. Ibid.:1801-1802 (MIRA 17:12)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.



MURZIN, V.S.; RAPOPORT, I.D.

Study of electron-photon showers in iron. Zhur. eksp. i teor. fiz. 47 no.1:3-6 Jl '64. (MIRA 17:9)

1. Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.

[redacted], I. [redacted]; [redacted], N. L.; [redacted], V. [redacted]; [redacted], I. [redacted]; [redacted], G. [redacted].

"Investigation of primary cosmic rays from the scientific space station proton-I."

paper presented at the 16th Congress, Intl Astronautical Federation, Athens, 12 Sep 65.

L 45258-66 FSS-2/EWT(1)/EWT(m)/FCC/T JKT/TT/JT/GW

ACC NR: AP6016330 (N) SOURCE CODE: UR/0026/65/000/012/0007/0015

AUTHOR: Grigorov, N. L.; Nesterov, V. Ye.; Rapoport, I. D.; Savenko, I. A.; Skuridin, G. A.

ORG: none

TITLE: Nuclear laboratory in space

SOURCE: Priroda, no. 12, 1965, 7-15

TOPIC TAGS: high energy particle, primary particle, cosmic ray, high energy electron, electron spectrum, interplanetary space, earth atmosphere, gamma ray quantum /Proton-1 satellite, Proton-2 satellite, SEZ-12 spectrometer, SEZ-14 spectrometer, GG-1 gamma ray quantum spectrometer

ABSTRACT: The author discusses various efforts made to study the microcosm from the interaction of high-energy particles and add that since no construction of accelerators of higher energies than those in operation now is foreseen for the next 10-15 yr, cosmic rays will be for a long time the only source of information on the interaction of high-energy particles. In this connection Soviet efforts in various

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ACC NR: AP6016330

high-level observation stations are mentioned. Problems to be solved are the very small density of cosmic ray fluxes, the need to measure the energy of primary particles, and the fact that they are usually mixed with secondary particles unless measured outside the atmosphere. The authors state that artificial earth satellites have opened the way to the use of cosmic rays for the study of super-high energies. They then describe the appearance and structure of the Proton-1 space station and the instruments it carries. They also give a detailed description of the ionization calorimeter used on Proton 1 to study high-energy particles, designed in 1954 by Professor N. L. Grigorov and produced and studied in the cosmic-ray laboratory of Moscow State University in the late fifties- and early sixties. The authors then describe the structure and operation of the SEZ-14 spectrometer for energies and charges, as well as its proportional counter and interaction detector. In order to remedy the lack of information on the energy spectrum of primary electrons, the Proton 1 carries a SEX-12 instrument to register high-energy electrons and their energy spectra. A GG-1 instrument was also installed on Proton 1 to study gamma astronomy. This study of gamma rays will facilitate obtaining information not only on sources of cosmic rays, but also on the astrophysical characteristics of interplanetary space. Information on cosmic rays in the Megagalaxy can be obtained

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ACC NR: AP6016330

at present only by measurement of intensity and spectra of gamma-quanta of an energy exceeding 50 Mev. The author concludes that the heavy Earth satellites Proton 1 and the recently launched Proton 2 are pioneers in the study of interactions of energies at 10 to 1000 gev. Orig. art. has: 9 figures. [GC]

SUB CODE: 03, 04, 20/ SUBM DATE: none/

Card 3/3 fdh

L 15793-66 EWT(1)/EWA(h)
ACC NR: AP6002288 SOURCE CODE: UR/0180/65/000/006/0079/0080

AUTHOR: Gadalov, A. N.; Mineyev, Yu. V.; Rapoport, I. D.

ORG: NIIYaF

TITLE: Linear gating device

SOURCE: Moscow. Universitet. Vestnik. Seriya III. Fizika, astronomiya, no. 6, 1965, 79-80

TOPIC TAGS: pulse analyzer, gate signal, nuclear physics apparatus

ABSTRACT: A linear gate, employing two identical cascaded stages, with a large dynamic range capable of passing pulses of the order of 1 μsec is described. The second stage helps to reduce the effect of the trigger pulse on the output and creep-through by the gated signal. Since two of the transistors in the gate circuit are strongly saturated in the closed state and hence respond relatively slowly, the input pulse is delayed by about 0.2-0.3 μsec and its front is stretched. This disadvantage can be largely eliminated by using high speed transistors. The gate can pass higher level input signals if the power supply voltage is raised. It

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L 15793-66
ACC NR: AP6002288

works at -20 to +45°C. In conclusion the authors express thanks to I. A. Savenko for assistance in the work. Orig. art. has: 1 figure.

SUB CODE: 18, 20,09/ SUBM DATE: 26Feb65/ ORIG REF: 003/ OTH REF: 000

Card 2/2 VMS

L 3231-66 EWT(1)/FCC/EWA(h) GS/GW

ACCESSION NR: AT5023625 UR/0000/65/000/000/0485/0486

AUTHORS: Grigorov, N. L.; Rapoport, I. D.; Savenko, I. A.; Skuridin, G. A. 34 41

TITLE: Problems and potentials of studying cosmic-ray particles of high and very high energies

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 485-486

TOPIC TAGS: cosmic ray particle, high energy particle, calorimeter, ionization, spark camera, nuclear emulsion, Cerenkov counter

ABSTRACT: Cosmic ray particles with energies up to about 10^{19} ev have been detected, but quantitative measurements are uncertain because the flux of high-energy cosmic particles is small at stations in high mountains and at sea level where they are observed and because no method of measuring individual particles has been available. Theory and experiment show a very weak dependence of interaction among high-energy particles on the energies of the primary particles. Most problems yet unsolved relative to nuclear interaction of high-energy particles and relative to the astrophysical aspect of cosmic rays require an ability to

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ACCESSION NR: AT5023625

measure the energy of each individual particle in order for a solution to be reached. The authors point out that the use of an ionization calorimeter in combination with various recording devices (nuclear photoemulsions, spark cameras, Cerenkov gas counters) permits detailed study of interaction processes of particles with energies of 10^{12}—10^{13} ev, study of the electron component of cosmic rays up to high energies, and a wide search for local sources of high-energy gamma quanta. By means of a large ionization calorimeter with an area of 10 m^2, raised beyond the atmospheric boundary, it would be possible to make direct measurement of compositions and energy spectra of primary cosmic rays in the energy range up to 10^{16} ev. [04]

ASSOCIATION: none

SUBMITTED: 02Sep65 ENCL: 00 SUB CODE: AA, NP

NO REF SOV: 002 OTHER: 000 ATD PRESS: 4106

Card 2/2

GADALOV, A.N.; MINEYEV, Yu.V.; RAPOPORT, I.D.

Linear gating circuit. Vest. Mosk. un. Ser. 3: Fiz., astron. 20 no.6:79-80 N-D '65. (MIRA 19:1)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo universiteta. Submitted Febr. 26, 1965.

L 4475-66 EWT(l)/EWT(m)/FCC/T/EWA(h) IJP(c) GW

ACC NR: AP5024626 SOURCE CODE: UR/0048/65/029/009/1656/1663

AUTHOR: Grigorov, N.L.; Rapoport, I.D.; Savenko, I.A.; Skuridin, G.A.; Shestoperov, V. Ya.

59
02
19

ORG: none

TITLE: Some problems and possibilities relating to investigation of cosmic rays in the 10^{11} to 10^{13} eV range /Report, All-Union Conference on Cosmic Ray Physics held at Apatity 24-31 August 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 9, 1965, 1656-1663

TOPIC TAGS: primary cosmic ray, secondary cosmic ray, energy distribution, nucleon interaction, artificial earth satellite, high energy particle

ABSTRACT: The authors review the available data on the energy spectrum and absorption and interaction mean free paths of nuclear-active cosmic ray particles with energies from 10^{11} to 10^{13} eV. The data are discordant, and part of this discordance is traced to neglect of the fluctuation of the fraction of the primary energy that is transferred to neutral pions in an elementary interaction event. There is evidence that the absorption and interaction mean free paths are not energy independent. It would be desirable directly to measure the interaction cross section, but it does not seem practical to do this. To measure the interaction free path in carbon for nuclear-active

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ACC NR: AP5024626

particles with energies above 10^{13} eV to an accuracy of 10 % by means of a 10 m^2 ionization calorimeter operating at 3200 m above sea level, for example, would require 60 years of continuous observation. A satellite-borne ionization calorimeter with a geometric factor of 10^4 cm^2 sterad, however, could accumulate very valuable data within a few months. Meanwhile, it is anticipated that new installations now under construction or recently operative will soon clarify the situation with regard to the energy spectrum of the nuclear-active component and the altitude dependence of the nucleon component. Orig. art has: 11 formulas, 2 figures, and 5 tables.

SUB CODE: NP/ SUBM DATE: 00/ ORIG REF: 018/ OTH REF: 004

Card 2/2

L 21603-66 EWT(1)/EWT(m)/EWG(m)/T/EWA(h) IJP(c)
ACC NR: AP6007817 SOURCE CODE: UR/0120/66/000/001/0100/0106

AUTHOR: Grigorov, N. L.; Gadalov, A. N.; Mineyev, Yu. V.; Rapoport, I. D.; Savenko, I. A.

ORG: Scientific Research Institute of Nuclear Physics, Moscow State University (NII yadernoy fiziki MGU)

TITLE: Pulse-height recording and logarithmic conversion of pulse heights in the 10^4—10^5 dynamic range

SOURCE: Pribory i tekhnika eksperimenta, no. 1, 1966, 100-106

TOPIC TAGS: pulse recording, cosmic ray measurement

ABSTRACT: Intended for modern high-energy cosmic-ray investigations, a new logarithmic pulse-height converter covers a dynamic range up to 10^5 by means of an automatic conversion-scale change. The instrument error remains constant (10%) throughout the range. The logarithmic pulse-height-into-number conversion is effected by an oscillatory circuit tuned to the input pulses; the dynamic range of this circuit is 1000. A block diagram and a principal circuit of the transistorized pulse-

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L 21603-66

ACC NR: AP6007817

2

height converter are explained, and technical data on the principal parts is given. Also, the linear pulse gate, preamplifier, and control and scale-change circuit are described. Stable operation of the converter within -20+50C is claimed. A pulse-height discriminator circuit was suggested by A. S. Melioranskiy. "The authors wish to thank A. A. Sanin for his useful advice." Orig. art. has: 5 figures and 2 formulas. [03]

SUB CODE: 18, 09 / SUBM DATE: 03Feb65 / ORIG REF: 005/ ATD PRESS: 4318

Card 2/2 dja

ACC NR: AP6035701 SOURCE CODE: UR/0203/66/006/005/0957/0958

AUTHOR: Mineyev, Yu. V.; Napoport, I. D.

ORG: Institute of Nuclear Physics, Moscow State University (Institut yadernoy fiziki, Moskovskiy gosudarstvennyy universitet)

TITLE: Wide-dynamic-range linear gating circuit

SOURCE: Geomagnetizm i aeronomiya, v. 6, no. 5, 1966, 957-958

TOPIC TAGS: transistorized circuit, gate circuit, signal

ABSTRACT: A wide-dynamic-range linear gating circuit for investigating the space radiation spectrum is described (see Fig. 1). The voltage gain and dynamic amplitude

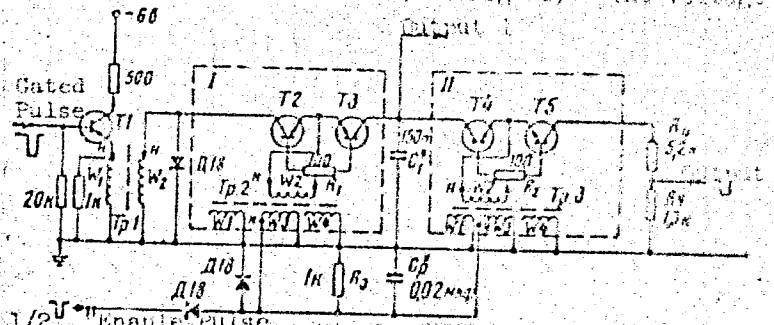

Fig. 1. Radiation pulse gate circuit

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ACC NR: AP6032701

range of the circuit (0.95 and 5000, respectively) are stable within the ambient-temperature range from -20C to +50C. The gate accepts negative pulses with heights varying from 4 mv to 20 v. The upper value is limited by the collector-to-emitter breakdown voltage of the 2T301B silicon transistors (T_2—T_5). The presence of two identical output stages reduces the magnitude of the "residual" caused by the control pulse to 20 mv and diminishes the unwanted signal when the gate is closed. Two potentiometers (R_1 and R_2) compensate for the difference in transistor characteristics. Orig. art. has: 1 figure. [3D]

SUB CODE: 09/ SUBM DATE: 02Feb66/ ORIG REF: 003/ OTH REF: 001/ ATD PRESS: 5094

Card 2/2

ACC NR: AP6034232 SOURCE CODE: UR/0120/66/000/005/0144/0146

AUTHOR: Gadalov, A. N.; Mineyev, Yu. V.; Rapoport, I. D.

ORG: Scientific Research Institute of Nuclear Physics, MGU (Nauchno-issledovatel'skiy institut yadernoy fiziki MGU)

TITLE: Logarithmic amplitude to digital converter based on a damped oscillating circuit

SOURCE: Pribory i tekhnika eksperimenta, no. 5, 1966, 144-146

TOPIC TAGS: analog digital converter, transistorized circuit, circuit design

ABSTRACT: A logarithmic amplitude-to-digital converter that converts amplitudes of scintillation pulses into a number of pulses is described. The converter (see Fig. 1) consists of a photoelectron multiplier (1), an amplifier (2), a discriminator (3), an LC tank circuit, a damping circuit (5), an anti-coincidence circuit (6), and a counter (4). Current pulses at the anode of the photoelectric multiplier excite damped 1-Mc oscillations in the turned LC tank circuit; the oscillations are amplified and applied to the discriminator where serial pulses are formed. The number of serial pulses is proportional to the amplitude of the oscillations. The counter is switched on when a control pulse is applied to the anti-coincidence circuit, i.e., the control pulse blocks the damping circuit. In the absence of a control pulse oscillations in

Card 1/2 UDC: 621.314.2